

CLAIMS

What is claimed is:

1. A signal bearing medium tangibly embodying a program of machine-readable
5 instructions executable by a digital processing apparatus to perform a method for
ensuring consistency of a group of data objects, the method comprising the following
operations:
 - receiving a first list that identifies objects in the group;
 - gathering, for at least one attribute, the value of the attribute for each object
10 identified in the first list;
 - storing the first list that identifies objects, and the attribute values gathered in the
gathering operation, to create a first snapshot of the first list that identifies objects and the
gathered attribute values;
 - receiving a second list that identifies objects that are in the group after at least part
15 of a task is performed, and the value after at least part of the task is performed of the at
least one attribute for each object identified in the second list;
 - storing the second list that identifies objects, and the received attribute values, to
create a second snapshot of the second list that identifies objects and the received
attribute values; and
 - 20 comparing the first snapshot with the second snapshot.
2. The signal bearing medium of claim 1, wherein the operations further comprise
failing the task if the first snapshot and the second snapshot are not the same.
- 25 3. The signal bearing medium of claim 2, wherein the comparing and failing
operations comprise:
 - determining if all of the objects identified in the first list are identified in the
second list and if all of the objects identified in the second list are identified in the first
list;

and if not, failing the task;

and if so, determining if the value of the at least one attribute for each object identified in the first list is the same as the value of the at least one attribute for the same object identified in the second list,

5 and if not, failing the task;

and if so, committing the task.

4. The signal bearing medium of claim 1, wherein the operations further comprise performing at least part of the task.

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5. The signal bearing medium of claim 4, wherein the task comprises backing up the objects identified in the first list.

6. The signal bearing medium of claim 5, wherein the operation of performing at least part of the task comprises transmitting the objects identified in the first list from at least one client to a backup storage server.

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7. The signal bearing medium of claim 6, wherein the operation of performing at least part of the task further comprises sending the objects identified in the first list to a backup storage server.

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8. The signal bearing medium of claim 7, wherein the operation of performing at least part of the task further comprises:

25 determining if all of the objects identified in the first list have been successfully stored on the backup storage,

and if not, failing the task of backing up the objects identified in the first list.

9. The signal bearing medium of claim 8, wherein the operation of failing the task comprises rolling back at least one commit by the server.

10. The signal bearing medium of claim 1, wherein the task comprises performing an installation.
- 5 11. The signal bearing medium of claim 1, wherein the task comprises performing a query.
12. The signal bearing medium of claim 1, wherein the group is a Cross Transaction Logical Object Group.
- 10 13. The signal bearing medium of claim 1, wherein the first snapshot corresponds with a time t1, and the second snapshot corresponds with a time t2, wherein t1 is before t2.
- 15 14. The signal bearing medium of claim 1, wherein the operation of receiving a first list that identifies objects in the group comprises generating the first list.
15. The signal bearing medium of claim 14, wherein generating the first list comprises scanning a subset of a filesystem's directories.
- 20 16. The signal bearing medium of claim 14, wherein generating the first list comprises scanning at least one directory on each of a plurality of clients.
- 25 17. The signal bearing medium of claim 14, wherein the operation of receiving a second list that identifies objects in the group after at least part of the task is performed comprises generating the second list.
18. The signal bearing medium of claim 17, wherein generating the second list comprises scanning a subset of a filesystem's directories.

19. The signal bearing medium of claim 17, wherein the comparing and failing operations comprise:

determining if the first list and the second list identify the same objects;

5 and if not, failing the task;

and if so, determining if the value of the at least one attribute for each object identified in the first list is the same as the value of the at least one attribute for the same object identified in the second list,

and if not, failing the task;

10 and if so, committing the task.

20. A signal bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform a method for ensuring consistency of a logical group, the method comprising the following operations:

15 generating a first list that identifies objects in the group;

gathering, for at least one attribute, the value of the attribute for each object identified in the first list;

20 storing the first list that identifies objects, and the attribute values gathered in the gathering operation, to create a first snapshot of the first list that identifies objects and the gathered attribute values;

waiting for at least part of a task of backing up the objects in the group to be performed;

generating, a second list that identifies objects that are in the group after at least part of the task is performed;

25 gathering the value after at least part of the task is performed, of the at least one attribute, for each object identified in the second list;

storing the second list that identifies objects, and the gathered attribute values for each object identified in the second list, to create a second snapshot of the second list that identifies objects and the gathered attribute values;

determining if the first list identifies the same objects as the second list;
and if not, failing the task;
and if so, determining if the value of the at least one attribute for each
object identified in the first list is the same as the value of the at least one attribute
5 for the same object identified in the second list,
and if not, failing the task;
and if so, committing the task.

21. A computing system, comprising:
10 a memory; and
a processing device coupled to the memory, wherein the processing device is
programmed to perform operations for ensuring consistency of a group, the operations
comprising:
receiving a first list that identifies objects in the group;
15 gathering, for at least one attribute, the value of the attribute for each object
identified in the first list;
storing the first list that identifies objects, and the attribute values gathered in the
gathering operation, to create a first snapshot of the first list that identifies objects and the
gathered attribute values;
20 receiving, a second list that identifies objects that are in the group after at least
part of a task is performed, and the value after at least part of the task is performed of the
at least one attribute for each object identified in the second list;
storing the second list that identifies objects, and the received attribute values, to
create a second snapshot of the second list that identifies objects and the received
25 attribute values; and
comparing the first snapshot with the second snapshot.

22. The computing system of claim 21, wherein the operations further comprise
failing the task if the first snapshot and the second snapshot are not the same.

23. The computing system of claim 22, wherein the comparing and failing operations comprise:

5 determining if all of the objects identified in the first list are identified in the second list and if all of the objects identified in the second list are identified in the first list;

and if not, failing the task;

and if so, determining if the value of the at least one attribute for each object identified in the first list is the same as the value of the at least one attribute
10 for the same object identified in the second list,

and if not, failing the task;

and if so, committing the task.

24. The computing system of claim 21, wherein the operations further comprise
15 performing at least part of the task.

25. The computing system of claim 24, wherein the operation of receiving a first list that identifies objects in the group comprises generating the first list, and the operation of receiving a second list that identifies objects in the group after at least part of the task is
20 performed comprises generating the second list.

26. A computing system, comprising:
means for receiving a first list that identifies objects in the group;
means for gathering, for at least one attribute, the value of the attribute for each
25 object identified in the first list;
means for storing the first list that identifies objects, and the attribute values gathered in the gathering operation, to create a first snapshot of the first list that identifies objects and the gathered attribute values;

means for receiving, a second list that identifies objects that are in the group after at least part of a task is performed, and the value after at least part of the task is performed of the at least one attribute for each object identified in the second list;

means for storing the second list that identifies objects, and the received attribute values, to create a second snapshot of the second list that identifies objects and the received attribute values; and

means for comparing the first snapshot with the second snapshot.

27. A method for ensuring consistency of a group, comprising the following operations:

receiving a first list that identifies objects in the group;

gathering, for at least one attribute, the value of the attribute for each object identified in the first list;

storing the first list that identifies objects, and the attribute values gathered in the gathering operation, to create a first snapshot of the first list that identifies objects and the gathered attribute values;

receiving, a second list that identifies objects that are in the group after at least part of a task is performed, and the value after at least part of the task is performed of the at least one attribute for each object identified in the second list;

storing the second list that identifies objects, and the received attribute values, to create a second snapshot of the second list that identifies objects and the received attribute values; and

comparing the first snapshot with the second snapshot.

28. The method of claim 27, wherein the operations further comprise:

performing at least part of the task; and

failing the task if the first snapshot and the second snapshot are not the same.

29. The method of claim 28, wherein the comparing and failing operations comprise:

determining if all of the objects identified in the first list are identified in the second list and if all of the objects identified in the second list are identified in the first list;

and if not, failing the task;

5 and if so, determining if the value of the at least one attribute for each object identified in the first list is the same as the value of the at least one attribute for the same object identified in the second list,

and if not, failing the task;

and if so, committing the task.

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30. The method of claim 29:

wherein the operation of receiving a first list that identifies objects in the group comprises generating the first list, and the operation of receiving a second list that identifies objects in the group after at least part of the task is performed comprises
15 generating the second list; and

wherein the task comprises backing up the objects identified in the first list.